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| APPLICATION NO.                                                                                     | FILING DATE | FIRST NAMED INVENTOR            | ATTORNEY DOCKET NO. | CONFIRMATION NO.   |
|-----------------------------------------------------------------------------------------------------|-------------|---------------------------------|---------------------|--------------------|
| 10/023,163                                                                                          | 12/18/2001  | Cornelis Leonardus Gerardus Ham | NL000746            | 4649               |
| 24737                                                                                               | 7590        | 03/15/2004                      | EXAMINER            |                    |
| <b>PHILIPS INTELLECTUAL PROPERTY &amp; STANDARDS</b><br>P.O. BOX 3001<br>BRIARCLIFF MANOR, NY 10510 |             |                                 |                     | SHRIVASTAV, BRIJ B |
|                                                                                                     |             | ART UNIT                        |                     | PAPER NUMBER       |
|                                                                                                     |             |                                 |                     | 2859               |

DATE MAILED: 03/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                               |                  |
|------------------------------|-------------------------------|------------------|
| <b>Office Action Summary</b> | Application No.               | Applicant(s)     |
|                              | 10/023,163                    | HAM ET AL.       |
|                              | Examiner<br>Brij B Shrivastav | Art Unit<br>2859 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 14 January 2004.
- 2a) This action is FINAL.                    2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-10 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 18 December 2001 is/are: a) accepted or b) objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

|                                                                                                                          |                                                                             |
|--------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                              | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                     | Paper No(s)/Mail Date. _____ .                                              |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|                                                                                                                          | 6) <input type="checkbox"/> Other: _____ .                                  |

1. Applicant's request for continued examination (RCE) dated January 14, 2004 has been received and entered.

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morad (US 5,083,085) in view of Stewart C. Bushing; Magnetic Resonance Imaging, pp 148-150, 1996, Mosby-Year Book Inc (hereinafter Bushing), and further in view of Yoshiaki (JP 11221200).

As regards to claim 1, Morad teaches a magnetic resonance imaging apparatus comprising a gradient coil assembly for generating gradient magnetic fields in an imaging volume (column 1, lines 5-19). Morad also teaches the gradient coil assembly comprising at least three gradient coils for generating three different gradient magnetic fields (column 1, lines 20-28). Further, Morad teaches a conductive element (figure 1, numeral 13) in close proximity to at least one of the gradient coils (figure 1, numerals 12, 14; column 2, lines 24-44) in order to compensate self-induced eddy currents in the gradient coil assembly (column 1, lines 52-58). Morad does not specifically teach each of the gradient coils comprising a pair of coil elements arranged in different planar axis and the gradient coils are connected to independently controllable power supply.

Bushing teaches an MRI apparatus wherein each of the gradient coils comprising a pair of coil elements arranged in different planar axis (figures 12-4, 12-5, 12-6 and 12-17), and Yoshiaki teaches independently controllable power supplies.

It would have been obvious to one of ordinary skill in the art to implement the gradient coil arrangement teaching of Bushing having independently controllable power supplies of Yoshiaki in the gradient coil assembly of Morad to reduce eddy currents so as to improve image quality.

Claims 2 and 3 are further rejected as Moran teaches the presence of a conductive element in side of at least one gradient coil (figure 1, numeral 14, gradient coil, and numeral 13, a conductive element). Moran also teaches a conductive element, which is provided between the inner gradient coils and the outer gradient coils (figure 1, numerals 12-14).

3. Claim 4-6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morad US 5,083,085), Bushing and Yoshiaki (JP 11221200) as applied to claims 1-3 above, and further in view of Doty (WO 94/01785).

As regards to claims 4-6, neither Morad nor Bushing nor Yoshiaki teaches conductive elements comprising: a) an active or passive coil loop, b) the coil loop is connected to a separate loop amplifier, and c) the loop is electrically shorted. Doty teaches a gradient coil having active and passive coil loops, which are connected to separate amplifiers, and they are also short-circuited (figures 2, 6, 8, numerals 308, 801; 603; 808, 809). It would have been obvious to one of ordinary skill in the art to combine gradient coil arrangement of Doty with the gradient coil assembly of Morad,

Bushing and Yoshiaki to achieve a gradient coil system of reduced eddy currents improving image quality.

As regards to claim 10, neither Morad nor Bushing nor Yoshiaki teaches a gradient coil assembly with conductive elements to suppress high order behavior of the gradient coil(s). Doty teaches a gradient coil having conductive element(s) placed near the gradient coils to suppress their high order behavior (pages 33,first paragraph and page 35). It would have been obvious to one of ordinary skill in the art to adapt gradient coil arrangement of Doty with the gradient coil assembly of Morad, Bushing and Yoshiaki to achieve a reduced eddy current gradient coil system improving image quality.

4. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Morad (US 5,083,085), Bushing and Yoshiaki (JP 11221200) as applied to claims 1-3 above, and further in view of Mulder et al (WO 00/25146).

As regards to claim 8 and 9, neither Morad nor Bushing nor Yoshiaki teaches the conductive element as a conductive pad/plate or a conductive slit. Mulder et al teach an MRI apparatus including a conductive element as a conductive pad/plate/slit. It would have been obvious to one of ordinary skill in the art to use the conductive plate of Mulder et al as the conductive element with the gradient coils system of Morad, Bushing and Yoshiaki to reduce eddy currents improving image quality.

5. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Morad US 5,083,085), Bushing, Yoshiaki (JP 11221200) and Doty (WO 94/61785) as applied in claims 4-6 and 10, and further in view of Riess et al (US 6,509,555)

As regards to claim 7, neither Morad nor Bushing nor Yoshiaki nor Doty teaches a conductive element loop being driven by a signal taken from the gradient coil while using it as a transformer. Riess et al teach a hand held induction tool including a conductive element loop as a step-down transformer (figure 5, numeral 202). It would have been obvious to one of ordinary skill in the art to use step-down transformer conductive loop of Riess et al connected to the conductive elements of Morad, Bushing, Yoshiaki and Doty to have an inexpensive and simple arrangement for gradient coil shielding to improve image quality.

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brij B Shrivastav whose telephone number is 571-272-2250. The examiner can normally be reached on 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego F.F. Gutierrez can be reached on 571-272-2245. The fax phone

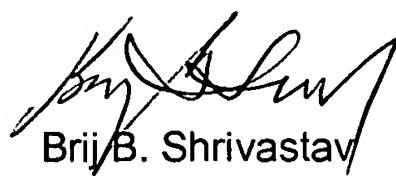
Art Unit: 2859

numbers for the organization where this application or proceeding is assigned is 703-872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-0956.

Bbs

February 20, 2004



Brij B. Shrivastav

Patent Examiner